



Magazine

MAY 1960

The *I.C.I. Magazine*, price twopence, is published for the interest of all who work in I.C.I., and its contents are contributed largely by people in I.C.I. Edited by Sir Richard Keane, Bt., and printed at The Kynoch Press, Birmingham, it is published every month by Imperial Chemical Industries Limited, Imperial Chemical House, Millbank, London, S.W.1 (Phone: VICTORIA 4444). The editor is glad to consider articles and photographs for publication, and payment will be made for those accepted.

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The I.C.I. Magazine

MAY 1960

Contributors



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Vernon Rowlands joined I.C.I. from Bangor University in 1937. Until the end of 1957 all his service was in the Research Department of General Chemicals Division except for six war years, when, as he says, "being a Territorial I escaped from Widnes." For the last 2½ years he has been working on silicon as a member of the Development Department of General Chemicals in Liverpool.



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FRONT COVER: Nagia Lake, Srinagar, Kashmir, by Dr. J. C. Hornel (Indian Explosives Ltd.)

(Argus camera, 35 mm. Kodachrome film, 1/80 sec. at f8)



POINT of VIEW

WORK AND ANTI-WORK

By Mark Abrams

At least since the end of the nineteenth century there have been experts dedicated to the task of raising the efficiency of the ordinary factory worker. The best known of the early prophets is Frederick W. Taylor, an American engineer, of whom it has been said that "he never loafed and he was going to make sure that nobody else did; he couldn't stand the sight of an idle lathe or an idle man." Taylor was obsessed by time; he was convinced that by a detailed study of every movement in a man's job it was possible to eliminate every waste motion and to use every minute of the working day. As a result, it would then be possible to lay down objectively the "right" amount of time to be given to every operation. Taylor became famous in 1899 when he taught a labourer to shovel 47 tons instead of 12½ tons of pig iron a day. From that point on the science of Taylorism (the elimination of waste motion) provided a new approach to management and to wage negotiation.

Some of his successors such as Frank Gilbreth and Charles Bedeaux added refinements to Taylor's ideas of scientific management, but fundamentally they remained unchallenged until the 1930s. Then Elton Mayo, an Australian working in the United States, began to publish the results of some of his studies of factory workers. To begin with, Mayo had started with the then orthodox management views on labour—that the worker was essentially a machine whose output would be determined by mechanical changes in environment and incentives. In the course of his experiments to measure the effects of such changes Mayo was puzzled by some unexpected findings. He discovered that his human guinea-pigs were inconsistent; sometimes when experimental working conditions were improved output went down; on other occasions, when experimental working conditions were worsened, output went up. Finally, Mayo offered a revolutionary explanation for these contradictions—that workers behaved like human beings and not like machines. He argued that they sometimes based their factory life—as well as their life outside the factory—on illogical and emotional sentiments and motives.

As management accepted these views Taylorism began to be modified by the "human relations" approach—by the view that greater work efficiency depended on contentment in work. As one of the new experts put it: "The more satisfied the worker is, the greater will be his self-esteem, the more content he will be, and therefore more efficient in what he is doing."

Once more scientific management altered its sights; and once more it ran into some disappointments. There seemed to be some workers who as they became more satisfied and more contented actually reduced their output; and there were others who positively seemed to resist management attempts to increase their satisfaction and contentment in their work. It was at this point that the experts began to employ an entirely different approach to the study of work. Instead of experimenting with the "guinea-pigs" they went to live among them; that is, psychologists and sociologists left their studies, put aside their slide rules, and took jobs on the factory floor. After a few months of such experience they came back with some new ideas.

They reported that even in the best-run factories there can be systematic "soldiering"; that in many shops the men have a pretty clear notion of what is a fair day's work and that they are critical both of those who surpass this and of those who fall short of it; that in some plants workers work all out part of the day so as to be comparatively free for the rest of the day; that some even prefer piece rates because this method of payment enables them to break up their time and rhythm to please themselves; that many workmen find the most satisfying outlets for their craftsmanship in their leisure and not in their work; that most of them are not interested in getting on through promotion in the factory but through their homes and their children.

In short, the new researchers are discovering that whatever may have been true in earlier times, ordinary men today are not simple economic machines responding precisely to nicely calculated incentives; nor do they believe unswervingly in work as a self-justifying activity in itself. It seems that in most of us at some time there are strong anti-work feelings and that the need to express these can be more satisfying than all the promised fruits of efficiency.

The opinions expressed in this article are not necessarily those of the Company



PURITY *and* PROGRESS

By Vernon Rowlands

The starting point is silicon 99% pure. The objective is silicon in which the impurity is one part in 1,000,000,000. This immaculate performance, so difficult and expensive to obtain, is a "must" for semiconductor grade silicon, in demand from General Chemicals Division for transistors and other electronic devices.

YOU—at any rate those of you who are beginning to worry a little about that spreading waistline or receding hairline—will remember the days of the crystal set. That little gadget, consisting essentially of a crystal and a thin wire—"a cat's whisker"—was used by hundreds of young enthusiasts to pick up and rectify radio signals.

Today crystal sets are rarely seen, but we still have little gadgets for picking up radio signals. They are more sophisticated (and many times more expensive) and are called transistor sets. This new gadget is the result of one of the most exciting developments in electronics—a development so bewilderingly rapid that we are still in the midst of new discoveries. And General Chemicals Division is playing its part in providing one of the new materials known as semiconductors from which electronic devices are now being made.

We all know that copper is a good conductor of electricity; we know, too, that materials like mica and

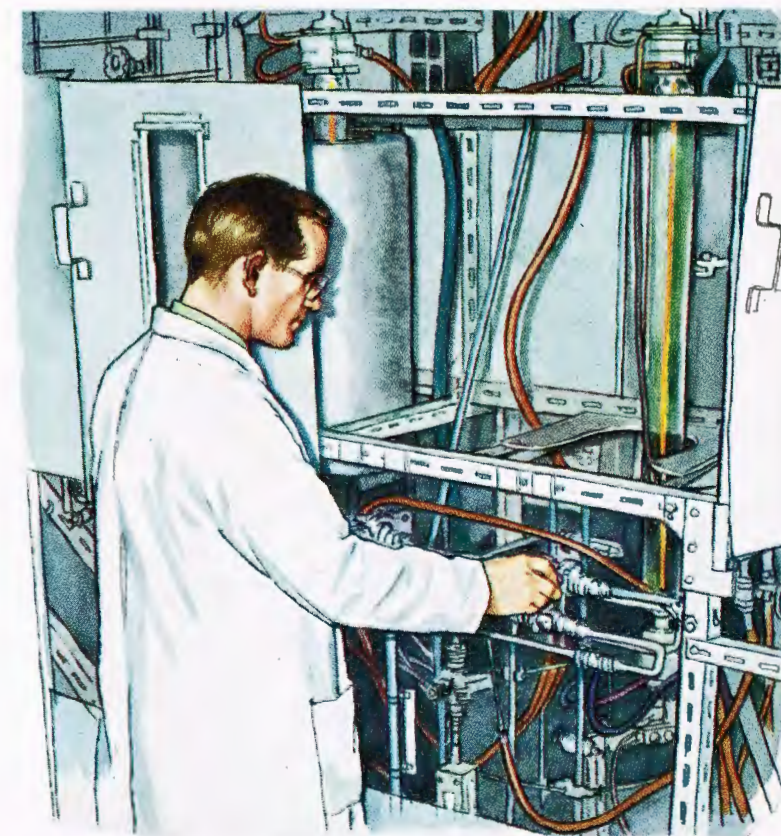
rubber do not conduct electricity and are insulators. Less generally familiar, however, is the fact that there is a class of materials intermediate between conductors and insulators which only partially conduct electricity. These are called semiconductors.

If these semiconductors are first prepared to an exceedingly high degree of purity and then very small amounts of certain materials are added, they show the electrical properties which are exploited in the latest electronic devices. Such devices can be used instead of the usual radio valve for rectification (that is changing alternating to direct current), for amplification, for generation of oscillations and for high-speed switching (that is turning a current on and off many, many times a second). At present, semiconductor devices are expensive compared with radio valves, but they have so many advantages that it has been forecast that by 1965 the majority of valves will be superseded by devices.

What are these advantages? A valve has a fragile



An outside view of part of the silicon plant



Making silicon
rod in a
pilot plant

glass envelope; it has a heating element which uses a considerable amount of electrical power and, moreover, an element which in time burns out; it depends on efficient vacuum technique; and the size, even of the midget valves, is about that of the tip of your little finger. In contrast, the semiconductor device is a solid body; it has no element to heat and no vacuum to preserve; and the smallest devices are comparable in size to match heads. Such advantages are very important, and they account for the tremendous interest in semiconductor devices shown by electronic equipment designers.

The two most used semiconductors are germanium and silicon. We must therefore say a few things about germanium, although silicon is our real interest. Germanium was studied in preference to silicon in the first few years of development mainly because of the ease with which it could be made sufficiently pure. This is largely because of its lower melting point compared with silicon. Germanium occurs only in very small concentrations in certain ores and constitutes a by-product from the treatment of such ores which contain other valuable metals.

Plentiful Raw Material

Silicon, on the other hand, is, next to oxygen, the most common element in the earth's crust. Once the methods of purifying it are fully developed, it could become cheaper than germanium. Moreover it has properties which for many applications are superior to those of germanium, the most important being that devices made from it will operate at temperatures up to 200° C. (cf. germanium up to 75° C.).

Probably the first manufacturer of high-purity silicon on a commercial scale was Du Pont, who started selling it about 1951. Later, other American firms entered the field and also the French firm Pechiney. Until I.C.I. announced their commercial manufacture of high-purity silicon in February 1958 there was no British producer. British device manufacture has been developed almost entirely on imported silicon, but British-produced silicon is now available from I.C.I. Provided they have material of the right quality available at a competitive price, the British device makers prefer an indigenous supply. This does not prevent I.C.I. from selling silicon abroad—in fact, many enquiries from foreign countries for I.C.I. silicon are now being received.

In little over three years the silicon process now

being used was developed at the Widnes Laboratory of General Chemicals Division. After examining several known methods of winning high-purity silicon from the ordinary material a suitable process was selected, and thereafter progress was rapid. First a small experimental plant in the laboratory was constructed, and hardly had this been worked efficiently before plans were formulated for a semi-technical plant. By the middle of 1958 small amounts of silicon were being offered for sale.

The first major setback now occurred. Although the silicon being made was extraordinarily pure, the impurity present (only five parts in one thousand million) was an unwanted one and customers reported that they were not satisfied. In a few months the process was modified so that silicon of the right kind was made. It was now apparent that the capacity of the semi-technical plant was not going to be large enough to meet the demand when customers started buying their full requirements. So an extension was planned. This has been made, and at this very moment further extensions still are about to be installed.

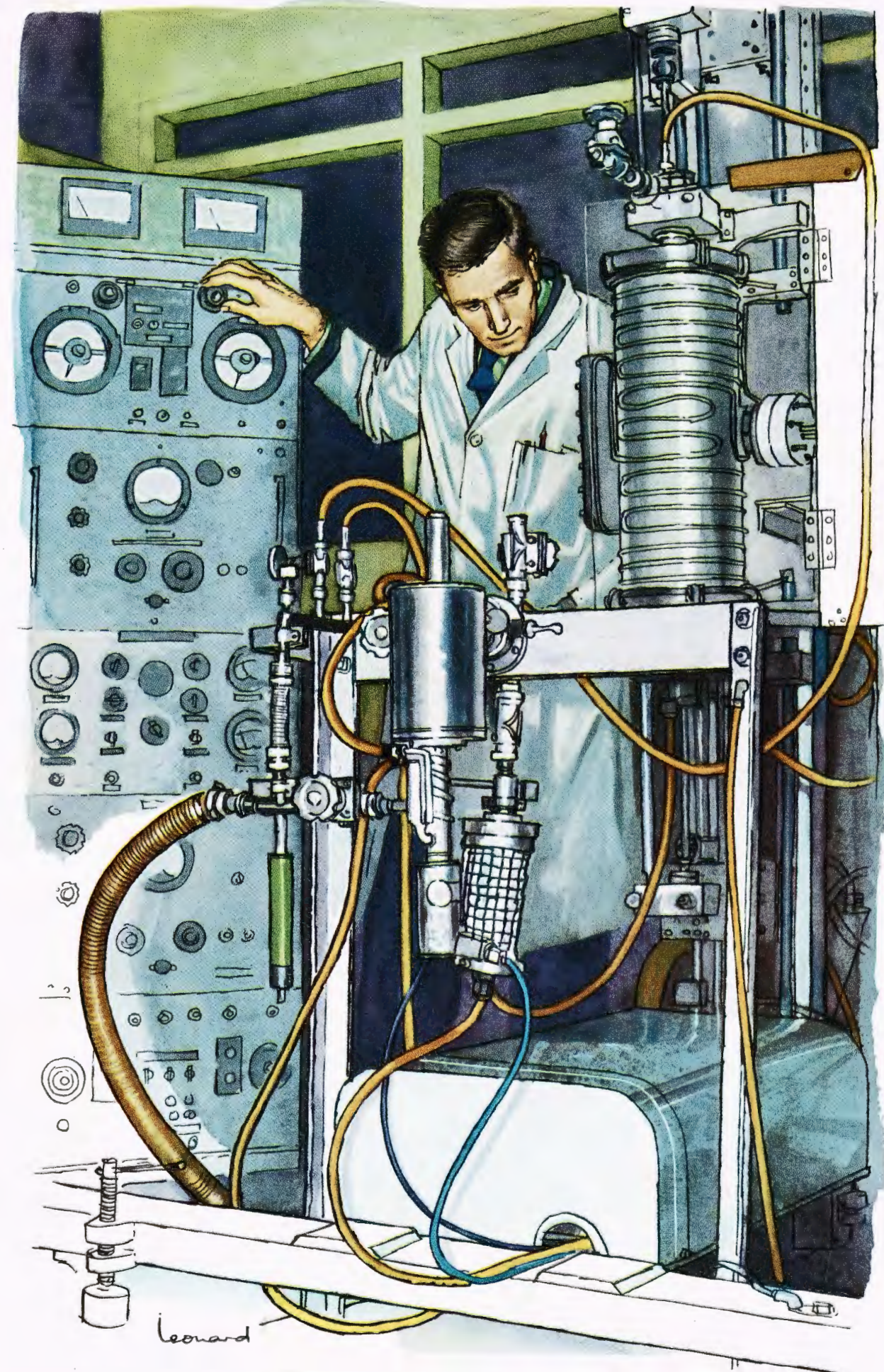
So far we have dealt with the general background to I.C.I.'s silicon project. Now we must examine silicon itself a little more closely.

Common Compounds

In nature silicon exists in combination with oxygen,—sand and quartz are two familiar silicon-containing compounds. Metallurgical grades of silicon, about 99.8% pure, are used in steel manufacture and more recently in the manufacture of silicones. Such silicon has a dark metallic grey appearance, it melts at over 1400° C., and it has a feeling of lightness, as its density is only about that of aluminium.

Now, in the very high purity silicon necessary for semiconductor work only one or two parts in a thousand million of impurity can be tolerated. Semiconductor grade silicon is made by several methods but, whatever the process, it costs some hundreds of thousands of pounds per ton—a very high price compared with many chemicals that sell in the £10 to £100 a ton range.

The measurement of the very small amounts of impurities in semiconductor grade silicon is extremely difficult, and normal chemical methods are not yet sufficiently developed to do this. Some success is claimed for radiochemical analysis, but even here the



Purification of silicon rod by zone refining

limits of detection, particularly for the elements of most interest, such as boron, are really not low enough. Furthermore, the radiochemical method is very tedious and costly. So the measurement of impurities is made second-hand by determining the electrical properties of the silicon.

Silicon with no impurities at all would have, theoretically, at room temperature, a resistivity of about 230,000 ohm-cm, the resistivity being a property governing the ability of the material to conduct current. As the amount of impurity increases, the resistivity decreases. The presence of about one part of boron in a thousand million of silicon will reduce the resistivity to about 100 ohm-cm. This is the order of resistivity which is necessary in semiconductor devices, although higher values of resistivity up to 1000 ohm-cm are required for certain uses.

Thus the resistivity is used as a criterion of purity. The matter is further complicated, however, by the fact that different impurities affect the silicon in different ways. For example, boron and phosphorus together in silicon tend to cancel each other out as far as reduction in resistivity is concerned, so we could

have a sample of silicon with a high resistivity yet with a relatively large amount of impurities. Such material is called compensated; fortunately there are methods of detecting compensation, so that this does not interfere with assessment of purity.

So much for the purity problem. The next headache for the manufacturer is to transform silicon from its natural polycrystalline state into what is called the single-crystal form necessary for making devices. This term may seem surprising to those of us who think of crystals as uniform sharp-edged solids, but in science it is used to describe any material where the arrangement of atoms is uniform and unbroken. Incidentally, "device" is the word used throughout the electrical trade to cover transistors which amplify currents, diodes which act as switches or rectifiers, and rectifiers which change alternating current to direct current. A device consists of a thin wafer of semi-conducting material, such as silicon or germanium, to which suitable wire contacts are connected, enclosed in a small container.

There are two ways of making single crystals—by crystal-pulling or zone refining. In crystal-pulling,



Putting on special anti-dust slippers before entering the treatment room



Girls working in the room where purified silicon is finally cleaned before packing

lumps of polycrystalline silicon are melted in a very pure quartz crucible and a small single crystal of silicon is dipped into the melt. The small crystal (or seed, as it is called) is slowly withdrawn, and the silicon solidifies as a single crystal as it is pulled out from the melt. In order to avoid contamination the operation is carried out in an inert atmosphere such as argon (gas pulling) or in vacuo (vacuum pulling).

The most recent requirement of device manufacturers is for silicon in rod form say $\frac{3}{8}$ in. diameter and 12 in. long. This form is suitable for zone refining, a technique already described in the "Modern Marvels" series of the *Magazine*, which is capable of producing higher-purity single crystals than crystal-pulling.

Finally, about the future. It has been suggested that, as silicon has so rapidly followed germanium, so may a new semiconductor supersede silicon. There are many new semiconductors being studied at present, and some of them have attractive properties; but they are normally two-element systems such as gallium/arsenic and are very difficult (and therefore

expensive) to produce in the necessary pure form. It is not expected that these new intermetallic compounds will affect the use of silicon for at least the next five to ten years.

There is no doubt that semiconductor devices will be used more and more. In 1958 there were about fifty million valves and devices being used in Britain, of which about 8% were devices. In 1965 there could well be as many devices as valves in use; and of these devices more are likely to be made of silicon than germanium.

Devices will probably be used in most, if not all, electronic circuits of the future, particularly those where compactness and reliability are important, such as airborne communications and navigation sets, guided missiles, portable microphone equipment, radio and television, and electronic computers. General Chemicals Division has in a very short time become the first British commercial producer of semiconductor grade silicon, and the market development of the product is now in full swing.

THE SILENT SALESMAN

By A. F. Much (I.C.I. Packaging Adviser)

Since the war there has been almost a revolution in packaging. Gone are the days when any container that was serviceable would do. Today the very sale may depend upon the attractiveness of the package. Furthermore, better design has led to savings in cost.

EVERY time you go into a shop and choose, say, shaving soap in a bright package, you are demonstrating the truth of a principle well known in retail selling: that packages are "silent salesmen," which are liable to tip the scales in favour of a product when the customer makes his choice.

A glance in any shop window shows you how seriously this principle is applied by manufacturers of goods sold over the counter. But only quite recently has the same principle been applied by such industries as the chemical industry.

The Americans are credited with being the first to discover that a customer for chemicals will choose—other things being equal, as they so often are—the product packed in a well-designed, well-constructed, well-painted container: rather a sobering discovery for an industry accustomed to selling its wares in anonymous sacks or rusty, battered and tar-besmudged drums. But it was a discovery that, once recognised, took hold fast. A chemical packaging revolution is under way, and naturally enough I.C.I., which spends about £10 million a year on packaging, is in the thick of it.

As far as I.C.I. is concerned it is, in fact, less of a revolution than the intensification of a process that has been going on for the last thirty years and that has now been lent added momentum by fiercer competition and new packaging materials. Each Division has its own packaging advisers, and their efforts are co-ordinated by the I.C.I. Packaging

Adviser and his staff. The job of all these packaging people is not simply to see that I.C.I.'s packages are attractive: they must also be serviceable and economical to handle and ship.

People of the "it-doesn't-matter-what-it-looks-like-as-long-as-it-gets-the-stuff-there" school of thought are apt to be disparaging about the smartening-up of packages, and think it an unnecessary expense. But that is just what it is not. Smartening-up is based on the discovery that appearances matter to our customers and on the axiom



A new look for methylene chloride drums. They catch the eye and please the customer.

that, while a good-looking package may not always win customers, a poor-looking package may help to lose them. What customers want is a good, clean, serviceable finish, with easily read markings positioned to suit warehousing and handling methods.

General Chemicals Division's new methylene chloride drum shown here is a good example of what can be done to spruce up a very ordinary package—and it is an important example, too, because drums remain the commonest package in the industry. For many years I.C.I. has been one of the country's biggest users of drums, and most of them used to be painted (often rather perfunctorily) in black and marked with stencil in white. Now nearly all I.C.I. Divisions mark their drums in two or more colours and have gone to a good deal of trouble with the design of the markings.

Research Pays Off

This is not a luxury that the customer pays for: the extra cost is absorbed by simplifying the actual construction of the drums. Alongside this superficial treatment, research has been going on into the physical suitability of drums for the job they do. Using such methods as slow-motion cinematography, the I.C.I. Packaging Adviser's section is finding out what really happens to a drum that is dropped, say, from the tailboard of a lorry, and their findings may well contribute something to the structural design of drums in the future.

The paper sack—of which I.C.I. is among Britain's largest users—is another example of a humdrum package that can be transformed by the intelligent use of colour and design, and here again the Company has made great strides. And although neither the new drums nor sacks can be said to give a tangible selling advantage, at least they do not have the unattractive appearance of the old.

For tangible results you must look at other aspects of the packaging field. Some of I.C.I.'s most striking improvements have concerned export products and "economy by shape"—small changes in the design of a package that have made possible large savings in freight costs. A much-quoted example is of an I.C.I. product sold in the Far East which was found to be losing ground drastically to a competitive product from the U.S.A. Sales had fallen almost to vanishing point when a change was made in the dimensions and construction of the outer container. This brought a saving of more than £30 per ton of product shipped, a small part of which was devoted to improving the quality, appearance and labelling of the packages. The result—which may have surprised even the most optimistic—was that sales rose and the market was saved.

This is not a unique case-history. Another example is that of a large glass container cushioned in straw, whose volume for shipping purposes was nearly 10 cubic feet. Remodelling of the outer container reduced the volume

to 7 cubic feet, and redesign of the container itself, with no reduction in capacity, brought the volume down to 5 cubic feet—a saving, in terms of money, of from £20 to £30 per ton of product shipped. The addition of 1½ inches in length to another container saved the Company £12 per ton in packaging costs and 30s. per ton in handling charges and carriage to the docks. Quite small changes in the design of packages for various other I.C.I. products have given savings in shipping charges of from £3 to £5 per ton of product shipped.

Quite apart from saving money in shipping charges, "economy by shape" has given rise to some interesting packaging innovations. Dyestuffs Division alone has been responsible for three: the "Bowmic," a large wire-mesh crate with an enormous paper sack tailored to fit loosely inside, which carries up to a ton of dry goods; the "Tea Cosy," a large square bag made of weather-resistant paper, which is used to protect a ton of product packed in paper sacks and carried on a simple timber pallet; and the "Rigid Compal," an expendable pallet that can be assembled in a number of different ways to suit different packages.

For corrosive liquids, the glass containers that have served so well for 2000 years or more are giving way to plastic containers. The carboy of the future is likely to be a cubical or rectangular container made of polythene (or even polypropylene) and packed in some form of outer container—compact, easy to handle, and easy to form into unit loads for pallets to be moved by fork-lift trucks. At 6s. or 7s. each they will contain a ton of liquid for £12 to £14—a third of the cost of glass containers. And even in the stronger form needed for export shipments they will show savings of 50% in first cost, in weight, and in shipping space occupied.

Changed Outlook

All these developments, whether in form or appearance, are symptomatic of a changed outlook in the packaging world. A member of the I.C.I. Packaging Adviser's staff recalls visiting an I.C.I. factory fourteen years ago with a number of other packaging experts. Their object was to see if some of the factory's products—crystalline, granular and powdered—could not be packed in paper sacks costing much less than the steel drums, wooden kegs and casks currently in use. The party was received in a very kindly manner by the manager, for whom everyone had the highest regard. But to all intents and purposes the meeting missed its mark before it started, for he said: "Gentlemen, I am delighted to meet you, but I must say at the outset that I can't understand you coming here. The products of this factory use acid as a raw material and are acidic in character. I can't see any of them being suitable for packing into paper sacks." This factory is now using hundreds of thousands of paper sacks every year.

I.C.I.'s 1959 FIGURES

How the Press gave the News

Finance, Industry, and Commerce
By Our City Editor

C.I. SALES IN £509
PROFITS UP BY

I.C.I. HITS TARGET WITH 11 1/4% DIVIDEND

Workers to share £7,000,000



City Express
A Round Throgmorton-street waited for the dividend of the year. The dividend of 11 1/4% was paid to the shareholders of Imperial Chemical Industries Ltd. on 24th March 1960. The dividend was paid in cash and was the highest since 1954. The dividend was paid to the shareholders of Imperial Chemical Industries Ltd. on 24th March 1960. The dividend was paid in cash and was the highest since 1954.

I.C.I. PROFITS SHOW 64% INCREASE
MUCH FUTURE PROMISE

Imperial Chemical Industries' 1959 results are very impressive indeed. The company's sales for the year ended 31st December 1959 were £509 million, an increase of 11% on the £458 million of 1958. The company's profits for the year ended 31st December 1959 were £130 million, an increase of 64% on the £80 million of 1958. The company's dividend for the year ended 31st December 1959 was 11 1/4%, an increase of 1 1/4% on the 10% of 1958. The company's dividend for the year ended 31st December 1959 was £7 million, an increase of £1 million on the £6 million of 1958.

ICI sales and income soar

CITY NEWS Comment & Prices

DAILY MAIL
Mr. Paul Chambers, new chairman of ICI, said that the company's 1959 results were a "brilliant success". He said that the company's sales for the year ended 31st December 1959 were £509 million, an increase of 11% on the £458 million of 1958. He said that the company's profits for the year ended 31st December 1959 were £130 million, an increase of 64% on the £80 million of 1958. He said that the company's dividend for the year ended 31st December 1959 was 11 1/4%, an increase of 1 1/4% on the 10% of 1958. He said that the company's dividend for the year ended 31st December 1959 was £7 million, an increase of £1 million on the £6 million of 1958.

Spring double
ICI's sales top £500m.
Profits soar to £73m.

I.C.I. income up two-thirds

"The Guardian"
A successful year

I.C.I. SALES RISE BY £46M.
Increased divi

ICI's £7m BONUS TO WORKERS

COMPANY NEWS
I.C.I. PAYS 11 1/4% AGAIN

PAY-OUT HOISTS SHARES

Financial Times
The ICI dividend of 11 1/4% was paid to the shareholders of Imperial Chemical Industries Ltd. on 24th March 1960. The dividend was paid in cash and was the highest since 1954. The dividend was paid to the shareholders of Imperial Chemical Industries Ltd. on 24th March 1960. The dividend was paid in cash and was the highest since 1954.

BIG INCREASE IN I.C.I. INCOME

Dividend Satisfactory

Glasgow Herald
The preliminary results of Imperial Chemical Industries for 1959 can be regarded as highly satisfactory, although the increase of 3 1/2 per cent in the total dividend to 11 1/4 per cent falls short of the 12 1/2 per cent which extreme optimism had been expecting. The rise of 2 1/2 points in the final dividend to 11 1/4 per cent is strictly the same as the rise of 2 1/2 points in the preliminary dividend of 9 per cent. This is a generous increase of 3 1/2 per cent on the preliminary dividend of 9 per cent. This is a generous increase of 3 1/2 per cent on the preliminary dividend of 9 per cent.

Company News
I.C.I. PAYS 11 1/4% AGAIN

ICI's Brilliant Year

£7m. bonus hand-out for ICI workers

I.C.I. DIVIDEND UP FROM 8 TO 11 1/4%

LOSS PROFITS RISE 64% TO £73.1M.

Financial Times
The ICI dividend of 11 1/4% was paid to the shareholders of Imperial Chemical Industries Ltd. on 24th March 1960. The dividend was paid in cash and was the highest since 1954. The dividend was paid to the shareholders of Imperial Chemical Industries Ltd. on 24th March 1960. The dividend was paid in cash and was the highest since 1954.

Company News
I.C.I. PAYS 11 1/4% AGAIN

ICI have never had so good...

Reynolds News
The ICI dividend of 11 1/4% was paid to the shareholders of Imperial Chemical Industries Ltd. on 24th March 1960. The dividend was paid in cash and was the highest since 1954. The dividend was paid to the shareholders of Imperial Chemical Industries Ltd. on 24th March 1960. The dividend was paid in cash and was the highest since 1954.

NEWS IN PICTURES

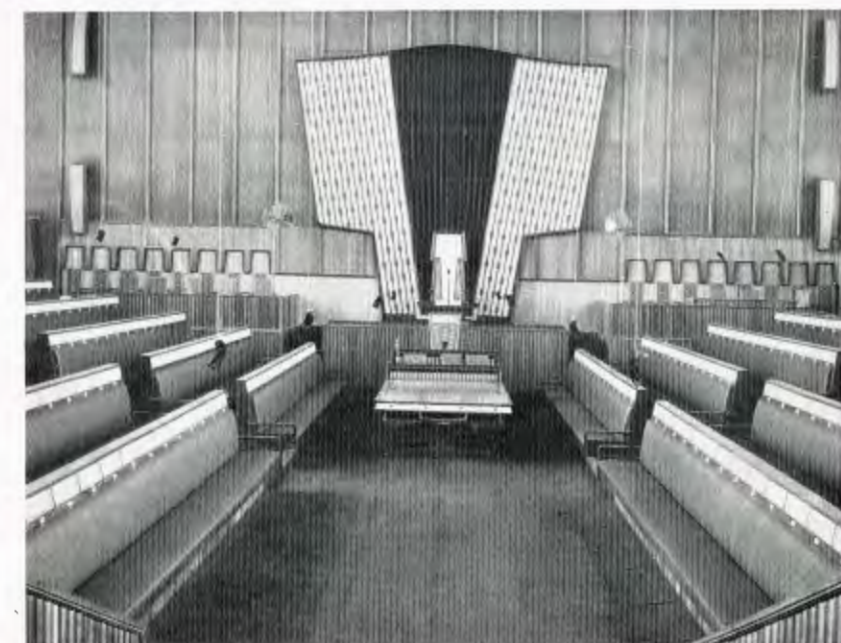
Home and Overseas



An 18 ft. Sydney Harbour racing skiff, *Miss Terylene*, sponsored by the Fibres Division of I.C.I.A.N.Z., can be easily identified as she races, by her I.C.I. roundel on the mainsail and her three spinnakers of crimson and royal blue 'Terylene.' Her crew of five, all skippers of their own boats, have to date sailed her to win seven events since they began racing last September



I.C.I. Rifle League champions this year are Billingham A team, who gain the trophy for the first time since 1952. The victorious marksmen are (left to right) Bob Featherstone (captain), Harry Smith, Tom Alderson (club chairman), Arthur Tindale and (inset) Phil Evans



'Vynide' made by I.C.I. (Hyde) Ltd. has been used to cover the Speaker's chair, throne and side seats in Lagos's new National Hall, which seats 1800 people. (The photograph was taken by the Ministry of Information, Lagos.)



Carnival Queen. For the second year running I.C.I. (Hyde) has provided Stalybridge with a charming carnival queen. Miss Vera Bridgehouse (right), who works in the process laboratory, was recently elected carnival queen for 1960. With her is Miss Eileen Quinn, the retiring queen



The official opening of Electroclor's £1½ million p.v.c. plant at Capitan Bermudez took place on 31st March. Electroclor is an associate company of Duperial Argentina. Here the Minister of Economy, Sr. Alvaro Alsogaray, cuts the tape at the plant's main entrance. With him is Sr. Silvio Gagliardi, Electroclor Chairman. The ceremony was attended by high-ranking Argentine government, army and ecclesiastical authorities and, from I.C.I., Mr. R. C. Todhunter, Overseas Director



Misk men's gift. A total of £200 safety award money won by Nobel Division's Misk Unit was recently divided and donated to four local institutions. Here members of the unit, invited to the Hazeldene Children's Hospital, see how some of the money was spent



Sartorial elegance. Mr. Norman Kilminster, an accountant at Metals Division, is the lucky winner of a prize of clothes to the value of £100 offered by *The Birmingham Mail* for the best suggestions for the ideal masculine basic wardrobe. Here, photographed by a *Mail* cameraman, he chooses part of his new outfit



Diamond wedding. Mr. William Shaw, an I.C.I. pensioner, and his wife Mary recently celebrated their sixtieth wedding anniversary. Mr. Shaw retired from the old Electro-Bleach factory at Middlewich shortly after it was taken over by I.C.I. They are photographed here with three of their children. A third son is living in Canada

This 'Portolite' flexible tank, made by Marston Excelsior Ltd., was used in a successful trial shipment of liquid across the North Sea. Lashed to a hatch in the bows of a Holland Steamship Company vessel, it behaved perfectly in spite of a force 8 gale



Mr. John Thompson, an apprentice electrician at Alkali Division, was recently awarded the Inman Youth Cup. Here Mr. J. K. Batty, the Division Chairman, who made the presentation, chats with John and his mother after the ceremony. The trophy is given annually to the apprentice or process trainee with the best record at work or technical school

Test for 'Terylene.' A fashion show with a difference was held in Sweden recently—it took place at and largely in a swimming pool. Aimed to show the wash 'n' wear properties of 'Terylene' clothes, the models first showed the clothes on dry land, then took a plunge in the pool. Afterwards the clothes were left to drip dry ready for the next show



Scatter rugs are not the latest thing in contemporary furnishings, but are a means of minimising the blast effect of explosives used in built-up areas. Here, together with short period caps which provide split-second delays in detonation of 'Dynamex' explosives charges, which are made by C-I-L Explosives, they are used within a few feet of Montreal's traffic during excavations for the site of a 2 million dollar project



Mr. Barrie Leslie of Paints Division sent this photograph home from Kenya, where he is giving a year's voluntary social service. As one of the first 18 youths in Great Britain to hold the Gold Standard of the Duke of Edinburgh's Award, he was chosen to go to Kenya by the National Association of Boys' Clubs. Here he is with a group of boys at the youth club he formed at Jeanes School, Lower Kabete



Two apprentice fitters in General Chemicals Division, (left) John Hollywood (Gaskell-Marsh Works) and Morris Starkey (Widnes Laboratory), played for the under-19s English Amateur Rugby League team against France at Bordeaux at the end of March

Changing a tyre on No. 1 rotary kiln at Alkali Division's Works is no mean task. This crane, owned by Tarslag Ltd., the biggest of its kind in Britain, had been brought from Sunderland and the crew had a tough job getting it over the Pennines in bad weather. In the top picture a giant 4-ton section of the kiln is suspended from the crane's 120 ft. jib



Ellis in wonderland. Mr. Ian Ellis of C-I-L might well have been heard to mutter "curiouser and curiouser" when he found himself projected camerawise into the new C-I-L headquarters of 1962. This intriguing photograph is a montage of no fewer than five pictures, comprising a model of an office, Mr. Ellis himself, the magnifying glass, a model of the new C-I-L House, and as a finishing touch the clouds in the background



Shooting the rapids. A canoeing demonstration before the Duke of Edinburgh when he visited the Devon Outward Bound School. Three Nobel Division girls were attending this particular course. In the picture Esna Morgan of Ardeer Factory occupies the rear seat of a canoe which is shooting the rapids

People and events . . .

Sales Top £500 Million

THE trading results of I.C.I. and its home and overseas subsidiaries show bigger sales, bigger exports and bigger profits. Group sales to external customers reached an all-time high at £509 million, which is £46 million up on the previous year's figures. Group income after taxation nearly doubled—£42 million as against £24 million—and £7 million of this goes into the Profit-Sharing Scheme. A final dividend of 1s. 6d. has been recommended, which together with the interim dividend declared last September makes a total of 2s. 3d. per £1 unit. Last year's dividend, expressed on the same basis, was 1s. 7-2d. (8%).

Verdict of the Press

THIS is how some of the papers received the news.

"The eagerly awaited results of Imperial Chemical Industries for 1959 measure up to even the extravagant expectations entertained by the market and represent a useful improvement on the figures for the first half of the year, which themselves were excellent."—*The Times*.

"Around Throgmorton Street last night they waited for the Dividend of the Year as though it were the Grand National winner. It was, of course, from the impeccable Imperial Chemical Industries. Over the tapes it came . . . final 1s. 6d. a share, making 2s. 3d. Which is a rise in total pay-out from 8% to 11½%. And that is just about what everybody in the City had expected, for this I.C.I. dividend has been a main City talking point for weeks."—*Daily Express*.

"There will be a £71 smile on the faces of nearly 100,000 workers throughout the country this morning. For that is their average share out of a total of £7,100,000 which the giant Imperial Chemical Industries is dis-

tributing under its profit-sharing bonus scheme."—*Daily Herald*.

"Record sales and nearly doubled profits were the proud achievements last year of Imperial Chemical Industries, Britain's largest industrial enterprise."—*News Chronicle*.

"The [I.C.I.] dividend is lifted from 8% to 11½%. Some optimists in the market had been hoping for a 12% total payment. To all but these, however, the dividend should prove entirely satisfactory."—*Yorkshire Post*.

F.R.S. for Dr. Holroyd

ONE of I.C.I.'s deputy chairmen, **Dr. Ronald Holroyd**, was among the 25 new Fellows of the Royal Society elected at the end of March. He shares with Mr. N. L. Falcon, the chief geologist of the British Petroleum Company, the distinction of being the only industrial scientists so honoured.

His election brings I.C.I.'s complement of F.R.S.s up to three. **Dr. P. W. Brian**, head of the Microbiology Department at Akers Research Laboratories, has been a Fellow since 1958 and **Dr. F. L. Rose**, research manager of the Pharmaceuticals Division, for one

year longer. **Sir Alexander Fleck** and **Sir Ewart Smith**, our past chairman and deputy chairman, are also Fellows.

Dr. Holroyd is a recognised authority on the chemical uses of coal and petroleum and, during his time at Billingham from 1930 to 1952, he was closely associated with the developments in this field. He is currently a member of the D.S.I.R. Steering Committee for Fuel Research and of the Ministry of Power's Committee on Coal Derivatives.

Railway Planners

ALMOST everybody must feel an interest in what is going to happen to the railways, but for I.C.I. people there was an added reason for interest in Mr. Marples' recent announcement in the House of Commons of the new four-man railway planning body. **Dr. Richard Beeching**, I.C.I. Technical Director, is one of the members. The others are Sir Ivan Stedeford (chairman), who is chairman of Tube Investments; Mr. H. A. Benson, a partner in Cooper Brothers, chartered accountants; and Mr. C. F. Kearton, now joint managing director of Courtaulds and pre-war a chemist at Billingham.



Dr. Holroyd



Dr. Beeching

Another recent task of Dr. Beeching's has been to sit on the special committee set up by the British Association to investigate the costs and implications of adopting the metric system in this country.

Cup Final Referee

KEVIN Howley, a 36-year-old clerk in the engineering workshops at Billingham, has what is looked upon by referees as the prize job in English football—he will referee the F.A. Cup Final at Wembley on 7th May. Moreover he is probably the youngest who has ever been selected for the job.

What are his feelings about being in charge of the biggest occasion in the English soccer season? "It is the atmosphere that can be upsetting," he said, "but I shall be out on that Wembley pitch long before I blow my whistle at kick-off time—to get the feel of it. The players, although keyed up, are on their best behaviour. They know what sort of a spectacle the final is supposed to be, and who they are playing in front of. Because of this I expect it to be one of the easiest games I have refereed."

The crowd of 100,000 will be the biggest in front of which he has refereed, although he has previously been in charge of an international between Scotland and Wales, an England v. Hungary "under 21" match and two European Cup ties.

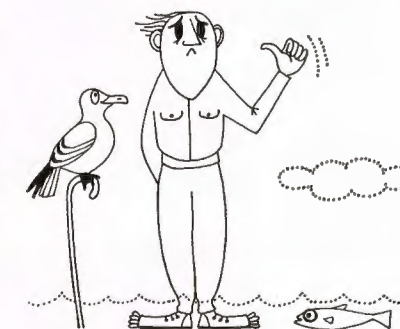
His wife Sheila will be in the Wembley stand along with his mother on the big day. Another fan will be his four-year-old son, who will be at his other grandmother's watching on television.

The Long, Long Walk

AS far as we know the only I.C.I. employee to take part in Billy Butlin's 1000-mile-long walk from John o' Groat's to Land's End was **Mr. James Dean**, a 21-year-old process worker at Alkali Division's Lostock Works.

Jim, who weighs only nine stone, entered the race without sponsors and without training. He walked in an old track suit and a pair of tennis shoes with the toes removed, sleeping and eating along the way whenever the opportunity arose.

He completed the marathon in 23



days, struggling to the finishing point with the aid of a walking stick. Then, discovering that funds had run low, he turned right round and hitch-hiked all the way back to Cheshire.

Jim says he is determined to enter the race again if it is held next year. But he has decided to train properly for that. This time he finished sixty-ninth, but with a sponsor and the right training, and the experience of this year's race behind him, he feels he could be right up among the leaders to share the spoils.

Mr. Cotton Retires

MR. J. H. Cotton, I.C.I. Treasurer since 1952, retired on 31st March. A colleague writes:

Like so many men who have reached senior status in the Company, John Cotton came to us, in 1928, from the Board of Inland Revenue and joined the Taxation Section. He was successively assistant treasurer, head of the Pensions Department in its difficult formative years (in which capacity he became a well known figure at Central Council), deputy treasurer and, finally, treasurer of the Company.

After service in the Army during the first world war, John Cotton won an open scholarship to St. John's College, Oxford, in 1919, being awarded while there the Casberd Scholarship in mathematics and obtaining first-class honours in his finals.

PEOPLE

Mr. Norman Langdale, education officer at Wilton Works, has been seconded for two years to the Commonwealth Relations Office for work in India. He will be director of practical training and placement, with the status of professor, at the new College of Engineering in Delhi.

Miss Rosalie Vervae, a 20-year-old clerk at Billingham Division's Commercial Works, won all four trophies awarded at the recent Ryton and District Musical Festival. The adjudicator was Mr. Gordon Thomas, Principal of the Guildhall School of Music in London, who said afterwards that he was very impressed by Miss Vervae's singing.

The next Mayor of Buxton will be an Alkali Division Lime Works employee. He is **Mr. T. H. Garton**, plant attendant at Hindlow Kilns. Mr. Garton has 38 years' service with the Company and has been a works councillor for the past 13 years.

Among a number of well-known Tees-side personalities recently appointed magistrates was **Mr. John Ginty**, a "Perspex" plant chargehand at Wilton.

Fifteen-year-old Jean Wood, daughter of **Mr. Jim Wood**, a chargehand in Wilton Plastics Works, gained second place in the British junior figure-skating championships.

An award of £60 has been made to **Mr. F. Sawyer**, a welder in Ammonia Works at Billingham, for a suggestion which has made the servicing of catalyst from ammonia crackers quicker, easier and more effective. It is the biggest made by the Division for a suggestion from a member of the weekly payroll.

Dr. Robert Westwater, manager of Nobel Technical Service Department, has been elected a Fellow of the Royal Society of Edinburgh. Professor Tom Cottrell, former personal assistant to Sir Ewart Smith, is also among the Fellows named.

Viscount Chandos, one of I.C.I.'s lay directors, has been awarded the 1960 Messel Medal of the Society of Chemical Industry. The medal is the senior award of the Society and is given every two years.

At St. John's he was a contemporary of such well-known I.C.I. personalities as **Mr. E. A. Bingen**, **Mr. P. A. Smith** of Pharmaceuticals Division, who has just retired, **Mr. W. d'Leny** and the late **Mr. Kenneth Gordon** of Billingham Division, while the late **Dr. M. P. Appleby**, for many years research director at Billingham, was a science don there at that time.



Mr. J. H. Cotton



Mr. A. E. Frost

John Cotton's acute mind was tempered by a great interest in human problems, and he had many friends in all ranks and parts of I.C.I. His only son, John, who himself has three sons, is a design engineer in Plastics Division, so that the family association with the Company continues.

John Cotton has recently joined the management committee of the Westminster Hospital, where his financial judgment will be of great value. We wish him and Mrs. Cotton every happiness in the future.

New Treasurer

Mr. A. E. Frost, who has succeeded **Mr. Cotton** as I.C.I. Treasurer, has the distinction of being the only barrister in a department staffed very largely by accountants. He is a specialist in tax law. Before joining Treasurer's Department eleven years ago he was with the Inland Revenue, and he is the author of the double taxation relief section of Lord Simon's treatise on Income Tax.

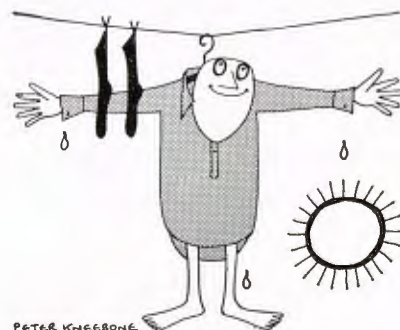
His chief interests outside the office are music and sport. He is an accomplished violinist (he was at one time a member of the London Senior Orchestra under Ernest Read) and enjoys nothing better than an evening spent in the company of musical friends playing Mozart and Beethoven quartets. He gained his county athletic colours with Lancashire and Hertford-

shire for both track and cross-country, and on more than one occasion has competed in the London to Brighton road race. Now he no longer takes part in competitive athletics but still enjoys a game of squash and puts in some hard walking at the week-ends.

Killing Two Birds . . .

DYESTUFFS Division's wonder dyes—the 'Procions'—already in wide use in over fifty countries, can soon expect a further big increase in popularity. An ingenious new process, recently developed by the dyeing technicians at Blackley, enables them to be applied to cotton and rayon at the same time as the fabric is resin-finished.

The synthetic resin treatment applied to dress fabrics to make them crease-resistant (or to shirtings to make them drip-dry) is normally a four-stage process: impregnation, drying, baking, and a final wash. This is practically the same as the technique used to apply 'Procion' dyes. By adding the 'Procion' dye to the resin



PETER KNEGBONE

bath along with a special catalyst discovered by Dyestuffs Division chemists, the dyeing and resin finishing can now be carried out simultaneously, with obvious savings in time, fuel and labour.

Dyestuffs Division anticipate an immediate popularity for this new two-in-one process, since it can be carried out in existing plant by established procedures. What is more, the resin finish is every bit as good as before, while the quality of the dyeing is even better.

Mr. Payne Retires

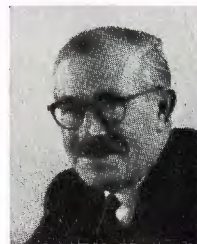
Mr. H. R. Payne, the man who more than anyone else has put

safety on the map in I.C.I., retired at the end of last month after 32 years' service.

When he first became responsible for accident prevention in the early 1930s the I.C.I. payroll stood at just over 30,000 and lost time accidents in the Company were averaging nearly 1800 a year. Last year 725 such accidents occurred with the payroll more than double at 73,000.

From 1936 until the end of the last war he was also occupied with Civil Defence planning, and it was largely due to his efforts that the Company entered the war years in a state of advanced preparedness.

Mr. Payne has been untiring in promoting industrial safety in a wider field and since 1955 has been chairman of the National Executive Committee of the Royal Society for the Prevention of accidents. He was awarded the O.B.E. in 1952 and the silver medal of the French Institut National de Sécurité in 1957 for services rendered to the cause of industrial safety.



Mr. Payne

Our Stand at New York

ONE of the largest spheres ever blown in 'Perspex'—it has a 5 ft. diameter—will decorate and dominate the I.C.I. stand at the British Exhibition in New York next month. Making the sphere, which is actually blown as two hemispheres, has been no mean task. It is in fact an extremely skilled operation, and Talbot Displays, who made the sphere for us, tell us that when blown at this extreme size 'Perspex' can be unpredictable—even the slight draught caused by an operative walking by is sometimes enough to cause a flat. The sphere houses a complicated molecular model in which the atoms are represented by I.C.I. roundels. The roundels themselves light up, and the whole sphere is presented against a background of constantly changing red, blue and purple lighting.

The I.C.I. stand, which has been designed by Hulme Chadwick, A.R.I.B.A., F.S.I.A., A.R.C.A., and produced by Central Publicity Department, carries the message that I.C.I. is the greatest name in British chemicals. Firstly there are large reproductions and dioramas of British pioneers of science. This is followed by a display of I.C.I.'s own more spectacular research achievements. These are split up into six groups: textiles ('Terylene' and 'Procion' dyes), nuclear engineering (beryllium and zirconium), petroleum chemicals, plastics (polythene), agriculture (gibberellic acid and 'Antrycide') and medicine ('Fluothane' and 'Mysoline'). In the centre of this area is a large-scale model of Alderley Park research laboratories.

* * *

Any big exhibition presents a host of problems to those taking part. Not the least of the difficulties about this one is that, because the I.C.I. stand is a double-decker one, which is almost unheard of in America, it has to conform to the stringent New York City code applicable to skyscrapers. In addition the stand has had to be prefabricated in such a manner that American labourers, who will not have seen anything like it before, can assemble it from scratch in six days.

Full Circle

NOBEL Division's headquarters are to be removed from Glasgow and re-established at Stevenston near Ardeer Factory, it was announced recently. New offices will be built at Stevenston, and these, with some existing accommodation, will permit the entire headquarters to be at one centre and not dispersed in three different places as at present.

The original move from Stevenston took place in 1946. It was largely a case of a quart in a pint pot. All available office accommodation was full to overflowing and building permits were unobtainable. Accommodation was, however, available in Glasgow, and to Glasgow therefore the headquarters moved.

Now, building permits are no longer the headache they once were, and the



The 'Terylene' advertisement which won a Layton Award



concentration of manufacture, especially at Ardeer and Dumfries, has made Stevenston a very attractive headquarters location once again. The transfer of staff from Glasgow back to Stevenston will be a gradual operation and will probably take 2-2½ years to complete.

Advertising Oscar

THE awards offered for annual competition by the London printing and blockmaking firm of C. & E. Layton Ltd. are the "Oscars" of the advertising world. This year there was a record entry of nearly two thousand, so it was with no little pleasure that Fibres Division learned that a 'Terylene' advertisement designed by Mather and Crowther Ltd. had been chosen by the panel of judges as the best textile advertisement in colour for 1959. We reproduce it in black and white at the top of the page.

All the entries were recently on view at the Stationers' Hall in London at a special exhibition opened by the Duke of Edinburgh, who also presented the Layton trophies. **Dr. A. Caress**, chairman of Fibres Division, received a bronze medal as representative of the principals.

£100 Smile

A BIT of steel in the right place will save Alkali Division approximately £200 a year, and has earned £100 for

Mr. Len Woodcock, an acting maintenance foreman at Wallerscotte Works.

The award was made after the Division Suggestions Committee had considered a suggestion from Mr. Woodcock for fixing a stop bar to the light ash conveyor at the Works to prevent the chain from fouling itself.

The mechanism has enjoyed trouble-free running since the modification, which proved particularly valuable recently in the fulfilment of large orders of light ash for India.



Mr. Woodcock

The award was a timely one for Mr. Woodcock and his wife, since they are looking forward to the first addition to their family.

More Severnside News

FURTHER plans for Severnside were announced last month. A new

IN BRIEF

Castle link with royal wedding. There is a special interest for Wilton in Princess Margaret's wedding. One of her small bridesmaids is 6-year-old Sarah Lowther, a granddaughter of Col. J. G. Lowther, former owner of Wilton Castle. It was from Col. Lowther that I.C.I. took over the lands on which Wilton Works has been built, and the Castle is now the administrative headquarters of the Works.

Stoppage at Wilton. Over a thousand members of the Amalgamated Engineering Union at Wilton Works stopped work on 28th March in protest over the disciplinary action taken by the management for a breach of safety regulations. The stoppage lasted for five days, after which a decision was taken to return to work.

End of Crosslee. Crosslee Mills (Nobel Division), which prepared cotton yarn doubles for safety fuse manufacture, closed down at the end of March. The closure of the mills has been made inevitable by increasing manufacture of safety fuse overseas. The first cotton mill on the site was built in about 1750 and was only the third such mill to be built in Britain.

"The day we land on the moon" was the intriguing title of a lecture given at Alkali Division's Lostock Works social club last month by Professor Z. Kopal, head of the Department of Astronomy at Manchester University. He also spoke about current research at Jodrell Bank and at the Pic du Midi observatory in France.

Clean bill. Mossend Factory (Billingham Division) recently completed three years without a lost time accident. They have now worked more than one and a half million hours without a lost time accident.

Glasgow fire. The Company has made a donation of £250 to the Glasgow Fire Disaster Fund for the dependants of the nineteen firemen and salvage workers who died in the whisky bond warehouse fire.

Airborne gardeners. Members of the horticultural section of Metals Division's Social and Recreational Club

chartered a plane and flew to Holland for the day on 23rd April to visit Amsterdam and the bulb fields.

Dai Rees at Wilton. Dai Rees, the British Ryder Cup captain, visited Wilton last month to lecture and demonstrate (with polythene practice balls) to members of the golf club there. He also played a foursome partnered by Bill Wright against club champion Eric Main and professional Hugh Laurie on the Wilton course, which he described as "absolutely magnificent."

'Fluon.' In Melbourne, Australia, surgeons have been conducting trials with transfusion tubes made from I.C.I. 'Fluon' polytetrafluoroethylene. A length of the tubing was specially flown from Welwyn for the trials. 'Fluon' has an extremely low coefficient of friction—that is, few things will stick to it. This makes it easier to remove from living tissue without causing damage, and also means that no clots form during blood transfusion—thus removing the fatal danger of thrombosis.

Fertilizers. I.C.I. is joining with W. & H. M. Goulding Ltd. in the manufacture and supply of fertilizers in Northern Ireland, and is to acquire from W. & H. M. Goulding a 51% holding in Richardsons Chemical Manure Co. Ltd. and Ulster Manure Co. Ltd. These companies supply, from their factories at Belfast and Londonderry, most of the fertilizer requirements of Northern Ireland.

Many a mickle. Mr. Joseph Foster, a dye tester at Grangemouth Works, Dye-stuffs Division, decided that the lengths of cloth used for steam padding tests in the standardising laboratory would be just as satisfactory twelve inches shorter. Trials proved him correct, and on an assessment of the savings involved he has been awarded £33 through the Suggestion Scheme.

'Visqueen' Down Under. I.C.I.A.N.Z. has decided to erect a new plant in New South Wales for the manufacture of 'Visqueen' polythene film. It will have a capacity of 1000 tons a year, enough to give the earth at the equator a 'Visqueen' cummerbund a yard wide.

Plans for extending the methanol plant at Heysham Works in Lancashire were announced at the same time. A plant to make 30,000 tons a year of methanol began production there only a few months ago. Now a further extension to make an additional 45,000 tons a year is to be built and is expected to come on stream during 1962. Methanol is used in the plastics industry, principally for 'Perspex.'

Herr de Haas Retires

HERR Emil de Haas, who has been one of the pillars of I.C.I.'s Frankfurt Office since it opened ten years ago, has retired. He has been right-hand man to no fewer than three successive I.C.I. liaison officers and has seen the office develop into a trading branch of I.C.I. (Export) and the staff—originally three—increase to twenty-seven.

Herr de Haas's wide knowledge of the German chemical industry and of the people in it—he was employed by the I.G. Farben Group before the war—have been of invaluable service to the Company—and many people in I.C.I. have cause to remember with gratitude his intimate acquaintance with the finer points of German law, taxation and commercial tradition, and his patient tuition in these matters. His mastery of English is superb and is perhaps best conveyed by the story that once, when accompanying English visitors to a German factory, he was complimented on his knowledge of German.

Strange Friendship

CHARLIE, a wise young owl who knows when he is well off, has made his home in the garden of 15-year-old Alan Beckett, who works at Alkali Division's Winnington Works. Alan, a keen ornithologist, found Charlie a year ago, a woebegone fledgling that had tumbled from its nest.

He took the young owl home and nursed it carefully, feeding it with lights each evening and leaving it to sleep during the day, when the strong light is so unwelcome. Now Charlie flies to



Alan Beckett and Charlie

greet him each evening when he returns home from work and sits on his shoulder awaiting his daily meal. While most people regard owls with a good deal of suspicion, Alan has no fear whatever of his pet.

The bird now spends most of his time between an old apple tree in the garden and the abandoned nest of a magpie, an earlier protégé of Alan's. Although he is now capable of flying and free to go whenever he chooses, Charlie has shown no inclination as yet to leave his garden haven.

Link with an Old Line

ONE of the oldest stretches of railway line in Scotland, the Garnkirk and Glasgow Railway, was in the news recently with the closing of Garnkirk passenger station. Nobel Division's St. Rollox Works has close links with this old line. Among those who worked hard for the railway was Sir Charles Tennant, the founder of St. Rollox Works, and one of the first engines specially built by Robert Stephenson & Co. of Newcastle-on-Tyne was named *St. Rollox*.

It was the *St. Rollox* which on 27th September 1831 pulled the first train-load of passengers from Glasgow to Garnkirk. At the controls was George Stephenson, the inventor of the *Rocket*.

The Caledonian Railway bought over the railway in 1846, and the original Glasgow terminus which was on the doorstep of St. Rollox Works was closed. But until only a few weeks ago a small stone building, the first

passenger booking office, still stood outside the west gate of the factory.

Behind the Price-cut

THE price of I.C.I.'s ground rock salt has been reduced by 5s. a ton. Its price is now 63s. a ton at works. The novel feature of this price reduction is that I.C.I. are passing on *anticipated* savings in costs to customers, for Salt Division do not expect to be able to achieve higher productivity and lower production costs until the autumn, when the modernisation of the rock salt mine at Winsford is due to be completed.

Rock salt is the material most commonly used in winter to keep Britain's roads free of ice and snow. Many thousands of tons are bought by local authorities between April and December for stockpiling against winter needs—last year about 33,000 tons were stockpiled by Yorkshire's local authorities alone. The price reduction now instead of in the autumn ensures that the early bird is not penalised.

Modernisation at Winsford, the only working salt mine in the country, is costing something like £½ million. When complete, output will be more than doubled.

Danish Polythene Plans

"DENMARK enters the Plastic Age" was the headline of a recent article in the Copenhagen paper *Politiken* referring to the formation of a joint company for the manufacture of polyolefines in which I.C.I. is to have a half-share with an organisation controlled by the prominent Danish shipowner, Mr. A. P. Møller, owner of the Maersk Line.

The company, to be known as Danbritkem, will operate a plant to be built alongside the Maersk refinery. It will be the first venture in which I.C.I. has undertaken joint manufacture of polythene in Europe and will be the second largest foreign investment in Denmark. I.C.I. already manufactures about 100,000 tons of polythene a year in its own plants in the United Kingdom and in the plants of subsidiary companies in Canada, India and Australia. A number of other

manufacturers throughout the world are producing, or will produce, polythene under licence.

★ ★ ★

Mr. A. P. Møller is 84 but still full of vigour. He has built up a multi-million undertaking in Denmark, the activities of which comprise, as well as shipping, a shipbuilding yard, a sugar plantation in Tanganyika and banking. The refinery provides town's gas for Copenhagen and ethylene for the Danish state alcohol factory.

The chairman of the new company will be Mr. Maersk McK. Møller, son of Mr. A. P. Møller. Other directors will be Mr. Hans Henrik Koch, Secretary-general of the Danish Atomic Energy Commission, Mr. Nielson, lately retired from I.C.I. Export, Mr. A. Renfrew, Plastics Division Overseas Director, and Dr. A. W. Taylor, Division Technical Director.

The new plant will have a capacity of 15,000 tons a year, and initially 'Alkathene,' the brand of polythene developed by I.C.I., will be produced. Much of the output will be used in Denmark, and the rest is expected to go to other Scandinavian countries.

APPOINTMENTS

Some recent appointments in I.C.I. are: **Alkali Division:** Mr. W. G. Ashley, Assistant Accountant (in addition to Mr. I. M. Ainslie). **Billingham Division:** Mr. H. Patterson, Division Staff Manager. **General Chemicals Division:** Mr. R. M. Maxtone Graham, Assistant Secretary. **Head Office:** Mr. A. F. L. Bowley, Head of Job Maxima Section of Central Staff Department. **Pharmaceuticals Division:** Mr. R. G. Hoare, Division Sales and Development Director. **Scottish Agricultural Industries Ltd.:** Dr. J. G. M. Bremner, Research Director. **The Regions:** Mr. J. Moore, Northern Regional Sales Manager (Chemicals) **I.C.I. Chile:** Mr. J. B. D. Pagden (President).

RETIREMENTS

Some recent announcements of senior staff retirements are: **I.C.I. Chile:** Mr. J. Carvallo, President (retired 31st March but retaining seat on Board until 31st December).

50 YEARS' SERVICE

The following employees have completed 50 years with the Company: **Alkali Division:** Mr. W. Hitchin, Winnington Works (18th March); Mr. T. Middleton, Buxton Works (1st April); Mr. F. Powell, Winnington Works (25th February). **General Chemicals Division:** Mr. F. Brown, Castner-Kellner Works (2nd March). **Nobel Division:** Mr. A. Ellen, Ardeer Factory (1st April).

ammonia plant, with a capacity of 100,000 tons a year, and associated plants to make urea and fertilizers are to be built there at a cost of upwards of £10 million. This second announcement within six weeks brings planned

expenditure on the new site up to over £15 million. The new plants, which are for Billingham Division, are expected to start production during 1963. Civil development work is planned to start on the site in May.

BIG GAME

caught by the camera

By D. D. Reucassel



A leopard at ease. Leopards often relax up trees and sometimes take the kill up with them.

IN 1898 President Paul Kruger set aside 1800 square miles of the Eastern Transvaal as an animal sanctuary. Progressively enlarged until it today covers 8000 square miles, this sanctuary has since become the Kruger National Park. It is here that all these photographs were taken.

From the moment the motorist enters the park he is under a set of rigid rules designed for his protection. You must be in camp half an hour after sunset. You must not drive off the road or leave your car. In fact, you are now a guest in an animal kingdom.

Inevitably, I am asked: How can one become a good game photographer? My reply is: You need a good camera with a telephoto lens, lots of patience, luck, a sense of anticipation, and a knowledge of the habits of the animals.

I have taken films of lions stalking and killing a zebra, of giraffe fighting, and of a lioness carrying a cub in her mouth. Without patience and understanding of the animals I would never have got these shots.

The lions started to manoeuvre for the kill at 8 o'clock in the morning, but they did not get into a favourable position to attack until 3 p.m. During those seven hours I was constantly on the alert. I finally photographed the attack on the zebra at 80 ft. from the camera. In anticipating that the lioness would stalk behind the cover of a mound I was able to get a unique film sequence since shown commercially to millions of people all over the world.



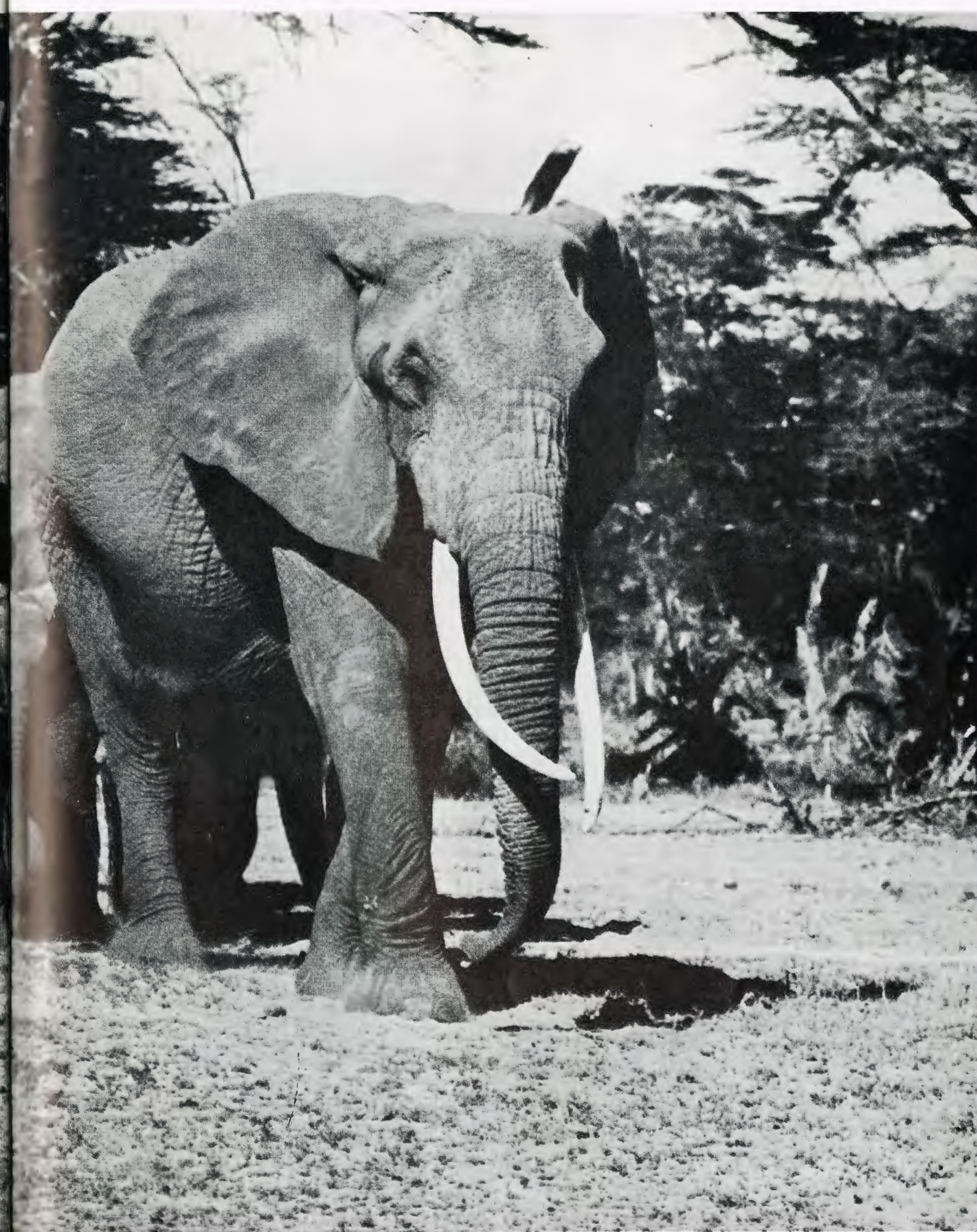
The elephant has poor eyesight, and it is doubtful if he can distinguish a moving object at 30 yards. On the other hand, his sense of smell is extraordinarily acute. It is not advisable to approach him closer than 50 yards. He eats approximately 800 lb. of vegetation every 24 hours and drinks 14 gallons of water at a "sitting."



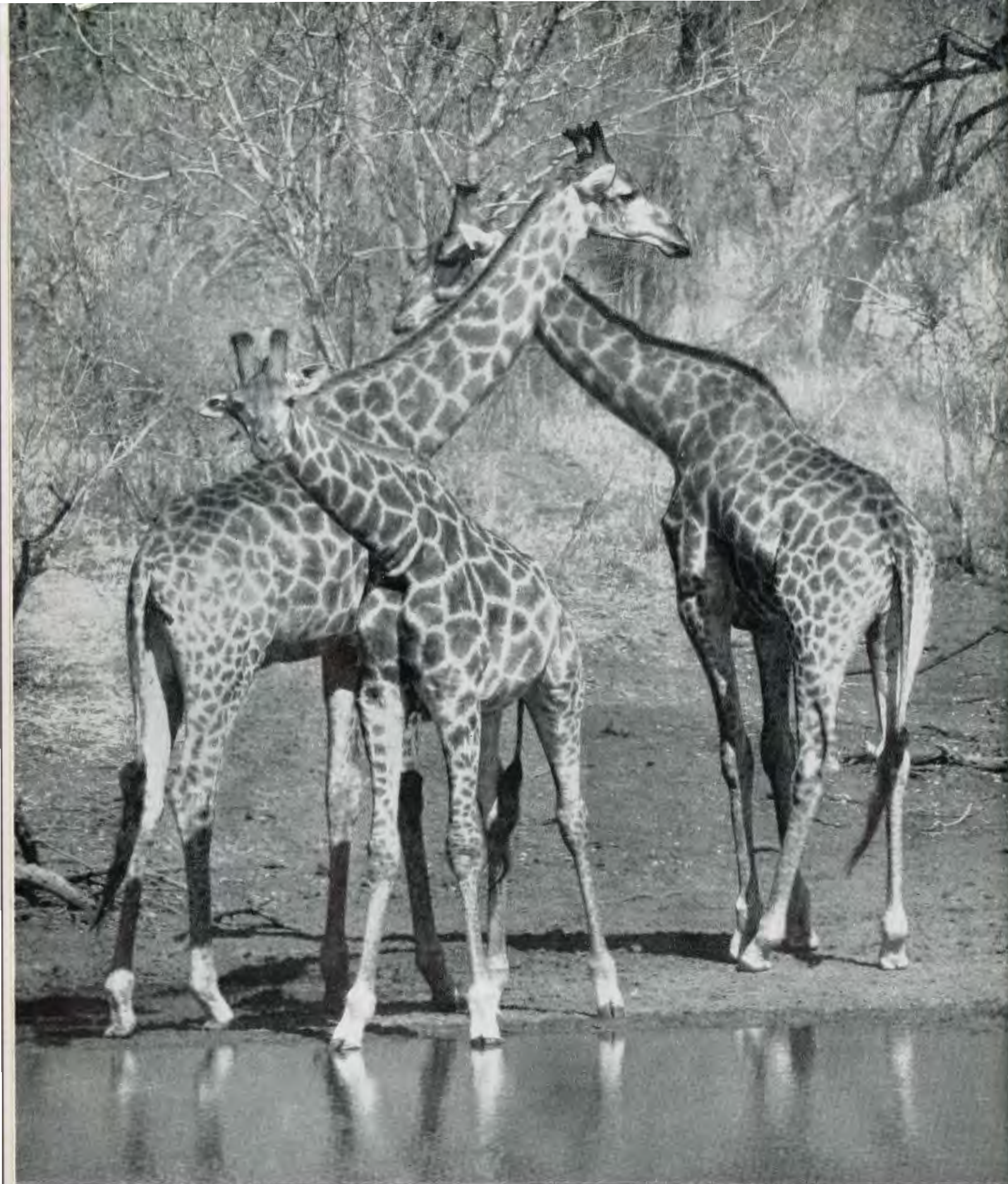
All quiet. Zebra in perfect condition drinking peacefully at a water hole.



Who's there? Zebra disturbed by the camera lose no time in making off.



Family party. How many elephants can you count? We make it seven.



Giraffe are the skyscrapers of the bush. Adult bulls are 17-18 ft. tall. With their thick hide, great strength, and the deadly kicks they can deliver with the forelegs, they are, to a great extent, unmolested by other beasts.

Carpet of Flowers

By Jean Duncan



A carpet of flowers. This is the loving tribute which every May the inhabitants of the little town of Sitges in Spain make to their Corpus Christi procession.

Photographs taken with a Kodak 'Bantam' Colorsnap camera on Kodachrome film, f/4.5, $\frac{1}{85}$ sec.

EVERY May the people of Sitges in Spain, about 20 miles south of Barcelona, celebrate their most important fiesta of the year, that of Corpus Christi.

For days beforehand boys and girls can be seen sitting in the doorways of this small town, picking the heads off flowers and storing them according to type and colour in huge raffia baskets. Then, on the evening before the festival, artists of the district set to work. They draw designs in indelible pencil on the narrow roads, following a preconceived pattern.

Early on Corpus Christi day the shopkeepers, their premises closed and shuttered, bring out the baskets of flower heads and with the boys and girls of the neighbourhood set to work to fill in the designs. This labour of love lasts for several hours. Soon onlookers, after an early breakfast, gather to admire the results.

I remember one flower pattern at Sitges last year which was in the shape of a brown wicker basket with a loop handle containing flowers and oranges. It was 7 ft wide and 10 ft. long. It lay undisturbed by wind and rain until 7 o'clock in the evening, when the religious procession passed along the winding flower-carpeted streets kept fresh by men with watering cans.

The young communicants led the way in pairs, first the little boys and then the little girls dressed in white. Each carried a long lighted candle as dusk was falling. Finally, the priest arrived at the main plaza and held a simple open-air service for all the thousands of people, most of whom had poured into the little town from miles around.

Late that evening there was a firework display and revelry. Next morning, the streets had been swept and tidied and business was back to normal.



Boys and girls filling in with
flower heads the designs
sketched on the road

A nearly completed design.
Admiring onlookers are cor-
doned off by ropes stretched
between chairs.



The flower-carpeted main street up which the Corpus
Christi procession will pass. Pavements are crowded with
onlookers.

May IN THE GARDEN

By PERCY THROWER

WE now look forward to the time when we can say we are safe from night frosts, which can do so much damage at this time of year. In my district, Shrewsbury, we never consider we are safe from frost until the last week in May. In southern areas that may be a week or so earlier, in northern areas a week or so later. So often we see tender bedding plants such as salvias, geraniums, lobelia and other half-hardy plants being offered for sale in late April and early May, and many people are tempted to buy should we get a few warm days, as we often do at this time.

It is very unwise to plant these and others such as marrows and outdoor tomatoes before late May or early June; even though a slight ground frost may not actually kill them, they can receive a check from which they will never properly recover.

As the wallflowers, forget-me-nots and other spring flowering plants finish, they must be cleared away to make way for those which will flower throughout the summer and autumn. The soil will need to be dug over, and over the surface put a sprinkling of an all-purpose fertiliser. Allow 2-4 oz. of fertiliser

for each square yard; it will mix with the surface soil as it is firmed and raked in readiness for planting.

Daffodils, narcissi and tulips lifted from the beds and borders must be heeled in, their roots and bulbs placed in a shallow trench and covered with soil, leaving the bulbs until the leaves have yellowed and died. The bulbs can then be lifted, and after drying them store away until planting time again in the autumn. Those daffodils and narcissi which have flowered so well in the grass must be left to die down before the grass is cut, otherwise next year's flowers may be fewer. The long grass does, I know, look rather untidy and when it is eventually cut has a brown appearance for some weeks. A light sprinkling of fertiliser after the grass is cut will help it to recover much more rapidly.

When planting out the summer bedding plants be sure to allow enough space for each one to grow and develop, and bear in mind that these plants will only give of their best if they are able to get the maximum amount of light and air. Leave at least 9 in. between the smaller plants such as alyssum, lobelia and French marigolds, and 12-15 in. between geraniums, sal-

vias, flowering tobacco plants and begonias.

Those from pots and boxes should be thoroughly soaked with water before planting. Make sure each one has its roots firmly pressed into the soil, and if the soil is dry water well after planting and again a few days later. Plant out chrysanthemums early in the month. In northern areas, dahlia tubers can be planted and gladioli. Spray roses for mildew and greenfly, fruit trees with a combined insecticide and fungicide, so killing two birds with one stone. Now is the time to keep pests and diseases in check.

In the vegetable garden this month I sow maincrop carrots, beetroot, and further sowings of peas, lettuce, spinach and salad onions to be sure of succession. Round about the middle of the month it is quite safe to sow runner and French beans, but plants of runner beans raised under glass must be left until the end of the month. Stir the soil between the onion rows weekly, prepare the trench for celery, and be sure to control pests and diseases in the vegetable garden. Begin by treating the seeds with a seed dressing, and from then on spray or dust with a good insecticide.

